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EDITORIAL NOTES

COKE SIZING

As long ago as 1930 we wrote in these columns: "For many years it has been the policy of the "JOURNAL" to stress the importance of coke in relation to the prosperity of the Gas Industry. . . . The particular point we wish to raise is this —has not the time arrived when the Industry should adopt a standard nomenclature for all coke sizes? . . . We would suggest that lack of uniformity in the size of material supplied has been the source of many of the complaints which have been made against coke. . . . We regard the whole subject of such importance that we are going to have the temerity to 'rush in' with our suggestions. We do this in the hope that the 'angels' will at their leisure avail themselves of our columns to discuss the matter." There followed our suggested coke nomenclature. Seven sizes were given, and they were named. Only one size had a horticultural designation—"beans." We realize this was unfortunate, but we were writing twelve years ago, and even to-day coke is being sold in many areas as though it was a vegetable. We ended our note: "The problem of the standardization of coke nomenclature by the official organizations of the Gas Industry is of great importance. . . . Such standardization would have a far-reaching influence upon the subject of coke sales and the consequent prosperity of the Industry." The London and Counties Coke Association tackled the matter and brought out its grading standard. In 1934 we urged that this grading standard should be generally adopted. As a matter of fact it differed little from our own suggestion in 1930, but it was simpler, consisting of four grades only; and we said that what we wanted the Industry to do was not necessarily to adopt the nomenclature we put forward but to adopt some national standard. That was the point.

The years rolled by. Now, after three years of war, we have the first part of the Report of the I.G.E. Committee of Enquiry on Coke Quality (last week's "JOURNAL," p. 98), and really there is not a great deal to be said about it. The recommendations—there are only three—merely demand action. The first recommendation is that all coke, for whatever purpose required, should be screened before sale to the consumer. The second recommendation is that the numbered sizes set out in the report (there are six of them) should be adopted as standard throughout the country. The evidence submitted to the Committee showed that the size limits of coke standardized by the L.C.C.A. meet with general agreement, and that no substantial variation is required in the limits of the respective sizes to ensure the satisfactory use of gas coke burning appliances. The third recommendation is that coke sizes should be known by the numbers given in the report, and not by fancy names. We obviously have no quarrel with the Committee's opinion that for some time to come the policy of the Gas Industry should be to develop as a two-fuel industry—namely, gas and coke—that coke should be considered as a processed fuel and not merely as a "residual." There are, of course, other conclusions in this first and commendably brief report of the Committee. They are of a practical nature, such as the need for re-screening sized coke at the point of loading, the importance of maintenance of uniformity of supplies in both size and quality, the benefit which the consumer would gain if the minimum fuel capacity of the No. 0 size domestic hot-water boiler was increased—by using a slightly larger size of boiler, the consumer would undoubtedly benefit in greater convenience due to better control of combustion and higher efficiency. As a first step towards an improved coke market, however, do let us agree upon, and when the time comes act upon, the size and nomenclature recommendations set out in this report of the I.G.E. Committee.

RESEARCH ASSOCIATIONS

In his paper on the policy and scope of the Gas Research Board at the June meeting of the Institution, Mr. E. V. Evans remarked that there is no good reason for suggesting that the best ideas are born in the largest laboratories, but that any idea has a better chance of survival and growth if suitable facilities are available. Ranking high among facilities is money, and a sound idea may have to be abandoned because the money is not available for its development. What may appear to be quite a simple investigation may prove unexpectedly costly in time or in apparatus, and it is here that a pooling of ideas and facilities should be helpful. He added that on the question of funds the Government has shown its readiness, on the recommendation of the Department of Scientific and Industrial Research, to give substantial assistance to industrial research associations, particularly where an association is already being wholeheartedly supported by its own industry. The Gas Research Board has thought it better not to make application for such assistance for the present, though the Articles of Association have been drawn up with the advice and guidance of the Department of Scientific and Industrial Research, so that, at the appropriate time, application for a grant may be made.

We return to this subject in the light of a recent Address by Professor Sir Lawrence Bragg, in which he touched upon the work of the industrial research associations and laboratories partially or wholly supported by the nation. We found the Address most fascinating. There is no need for us to dwell on the qualifications of the Author to survey this question, nor do we think we need apologize for quoting his comments at some length. The work of these associations, he said, is designed to help their particular industry, but they are also repositories of general knowledge and are in a position to undertake long-range research which will ultimately benefit the whole industry, as well as to apply themselves to particular problems of immediate interest. Without disparaging the achievements of these associations, he continued, in planning for the future one cannot consider that the last word in defining their scope and function has been said. In some respects they are in an intermediate position between the universities and industry, and they have peculiar difficulties of their own. The university researcher is kept on the alert by the exictement of the chase; he is hardened by the unsparing criticism of other experts. The industrial researcher is kept on the alert by the demands of his industry; he runs the gauntlet of criticism by his colleagues in the works and of the fierce test of results. But the danger of the research association is that of its men working in a vacuum, where they miss both of these incentives. Professor Bragg emphasized that he was in no way suggesting that the experiment should be discontinued. One ought, however, to face the existence of a widespread opinion that the flow from our research associations of fundamental ideas which would profoundly affect our industries has not yet reached the volume hoped for and anticipated. Lip service is paid to research because it is fashionable to do so, but responsible industrialists in private express their disappointment. This, said Professor Bragg, is a challenge which must be met.

The Author passed on to consider the difficulty, which in his opinion arises from a wrong conception of the nature of research. To set aside a definite body of men, with orders to spend their whole time on research with some definite end in view, is to court disappointment. "We may agree that it would be a good plan to improve the national standard of poetry. Shall we then build a fine house somewhere in beautiful surroundings,

put all our poets in it, supply them with pen and paper, and tell them to get down to it? . . . Ideas for research spring from contact with everyday scientific life. . . . It is only very exceptional people who can make a career of research and nothing but research." He then came to the idea of a central research association as being ideally a permanent laboratory with specialized equipment, but with a changing population, not as being a permanent body of men. Should not the industrial research association be a place to which firms send suitable men from time to time, where assistants and equipment are available, and where they can for a year or more develop some good idea of the longer-range type?

Turning to the opposite side of the picture, one only too commonly seen. Professor Bragg drew this vividly. A committee sits to direct a certain branch of research and a member proposes an investigation as worthy of attention. Staff and apparatus are set aside for it at the research association, and the men do their best to devise a technique and frame a programme. Through imperfect contact with industry they drift on to work which may be excellent, but which is not really along lines of profound value. A committee, in Professor Bragg's view, is too impersonal a body to direct research. Its members are generally too busy and important to give the necessary time and attention to detail. In his opinion, when a new line of this kind is started in response to a demand by industry, it would be generally advantageous if at the same time an industrial sponsor was appointed—not necessarily a member of the committee—whose special responsibility it would be to visit the laboratory at short intervals and to spend quite a large part of his time in directing the effort. "A day every other week of one expert's time is of infinitely more value than an hour or two of a large committee of well-known men which meets every two or three months; it is also more economical of the time of the best people."

The whole of the foregoing, we suggest, is germane to consideration of the future work of the Gas Research Board, and particularly perhaps of the ultimate establishment of a Government-aided research association for the Gas Industry. And fundamental to full success of such an association is that the firms supporting it should be willing to pool their knowledge and consent to problems which they know to be really important being handed over to a central organization. We must avoid the creation of a static body of researchers cut off from the real needs of the Industry.

A TRAINING COLLEGE

IN the years prior to the war the need for adequate training on the distribution and supply side of the Gas Industry was being increasingly recognized and steps were being taken to meet this need, which was growing in proportion to the rising standard of the service given to the consumer by the Industry. After the war the problem will remain, there will be a good deal of lee-way to make up, and it is obviously desirable that there should be extensive and effective facilities for the purpose. The letters which we have recently published in the "JOURNAL" from Mr. T. Smith, of Derby, and Dr. J. N. Long, of the Westminster Technical Institute (whose latest letter appears in our columns to-day), will have drawn attention anew to what is undoubtedly an important matter, and they have, we think, a considerable bearing on its solution. Mr. Smith's proposal is for the establishment, post-war, of a Gas Industry Training College complete with hostel facilities, the curriculum to include refresher courses as well as training. It should not, he argued, be regarded as a minor undertaking. There are about 40,000 normally employed in the distribution and sales activities of the Industry; taking an average working life of 40 years, there is an annual entry to the distribution side of 1,000 persons; each represents a capital investment of something like £5,000 and a load factor of 8 million cu.ft. Dr. Long, who said with justification that the question of residence is a difficult one, suggested that perhaps Mr. Smith was not fully aware of the work of the Westminster Technical College in co-operation with the training department of the Gas Light and Coke Company at Watson House, that one of the problems is to use to the full the capacity which was available at technical colleges throughout the country, that district organization might prove a wise plan, and that, above all, there must be co-operation from employers to release personnel for training in the daytime.

The need for training being, as we hope and believe, accepted, it is useful, we think, to recall what actually had been accomplished at Watson House in the years immediately preceding the war. A Domestic Centre had been established, and at the outbreak of war there were 85 undertakings subscribing to the scheme, which included the training of personnel from the subscribing undertakings. Experience had been gained of a nature which left no doubt as to the value of the scheme. Practical details were given pre-war in a Paper to The Institution of Gas Engineers by Mr. R. N. Le Fevre, who was Officer in Charge of Training.

The work was charged for at the rate of £1 per person trained per week. Arrangements were made for suitable accommodation in the vicinity of Watson House. A fixed rate of subsistence allowance was agreed upon by all undertakings in the scheme. Fitters, inspectors, and other officers were dealt with according to individual requirements on an agreed basis—the total cost for a fitter, for example, including his wages, his subsistence allowance, his training charge, was in the neighbourhood of £6 to £6 10s. a week. The whole plan was on a smooth running basis, in its infancy but showing great possibilities; it was felt by all participators that the money expended was being exceedingly well spent.

In considering post-war plans for the Industry, those concerned might to advantage, we think, bear in mind this proved and practical scheme which was giving so much satisfaction. It seems to us that after the war we shall not be brimful and running over with money, and that, though the idea of a "Gas Training College" with hostel facilities has appeal, the immediate needs for training might be met to equally good purpose by regional extension of schemes on the lines of the pre-war Watson House scheme.

Hygiene and Flueless Rooms

The ratio of sulphur dioxide to sulphur trioxide usually varies between 3 to 1 and 5 to 1 in the products of combustion of town gas. Sulphur trioxide becomes perceptible by smell when present in the atmosphere to the extent of 0.00002%. The Report of the I.G.E. Committee of Enquiry on Sulphur Removal ("JOURNAL" of Oct. 14, p. 58) stated that with a gas containing 3 grains of sulphur per 100 cu.ft. burning at the rate of 1 cu.ft. per hour per 100 cu.ft. of space in a room in which there is half an air change an hour, there should be no perceptible smell due to the products of combustion. This is equivalent to 10 cu.ft. per hour in a room of 1,000 cu.ft. capacity. If the air change was 3 per hour, then 60 cu.ft. of gas an hour could be burned fluelessly without any smell of sulphur. Other odours, however, have to be considered when the question of ventilating habitable rooms arises. Fresh air is required to keep body odours from becoming perceptible. The amount required varies with the density of occupation, with the cleanliness of the occupants, and with the pungency of smell of certain individuals which has nothing to do with personal hygiene—*i.e.*, frequent baths. Recent investigators have concluded that about 1,000 cu.ft. of fresh air per person per hour is needed, on a rough average, to counteract body odour. Four people in a room of 1,500 cu.ft. would require a minimum of nearly three air changes an hour. The conclusion may be drawn that the supposed saving to be made by constructing rooms without flues may be more than nullified by reducing the number of occupants the room may hold if due regard is to be paid to health and comfort. To revert to flueless heating, as far as smell is concerned, one average healthy adult is equivalent to two flueless gas heaters burning gas with 3 grains of sulphur at the rate of 10 cu.ft. each per hour. From the point of view of heat output, though, a flueless heater of the size is equivalent to 12 adults.

The foregoing is important when we consider the pre-war tendency to construct houses having some rooms without flues. We have no doubt that the personnel of the Gas Industry is strong in its condemnation of this practice, but maybe individual members are not *au fait* with the physiological effects of ill-ventilated rooms. In an

article in to-day's "JOURNAL" Radiation Ltd. place much information on the subject, and in a brief manner, before the Industry in the hope that it may prove useful in combating any tendency to perpetuate the bad practice of including flueless rooms in post-war buildings. There ought to be unanimity concerning the need for adequate ventilation. Co-operation between hygienists, the suppliers of sources of heating, and architects and builders should ensure that our post-war homes are constructed on correct principles—omitting the flueless room.

Research on Coke

Deterioration of the quality of blast furnace coke in 1918 caused an increased use of over 1 million tons to produce the same amount of pig iron as in 1918. Hence the importance at the present time of making available periodically to both makers and users of coke accurate information concerning changes in its quality. The matter is referred to in the progress report for 1941 of the Midland Coke Research Committee, in which it is mentioned that the quarterly and annual average values for moisture, ash, and 1½ in. shatter index of 18 South Yorkshire cokes are reported under code letters to the Committee, and marked changes are investigated. Although deterioration of quality occurred in individual cokes, it is satisfactory to record that although there has been an increase in mean moisture of about 1½%, the mean ash contents and mean 1½ in. shatter indices for the 18 cokes are substantially the same for 1941 as in 1937. The report also refers to a method which has been devised for the rapid simultaneous determination of carbon, hydrogen, sulphur, and chlorine in coal and coke which requires only 60 min. for the complete determination. The method is based on combustion in oxygen (10 min.) in an unpacked tube at a high temperature (about 1300°C.), a silver spiral being used to absorb oxides of sulphur and chlorine. The silver spiral is then weighed and is treated successively in hot water and concentrated ammonia to remove silver sulphate and silver chloride. The carbon dioxide and water are absorbed in soda-asbestos and anhydrone (magnesium perchlorate) respectively. The method uses simple apparatus and is suitable for routine use in works laboratories.

Parental Interest

We do not know whether this constitutes a record, but at the meeting of the Manchester and District Junior Gas Association this month the large number of "Seniors" present included the President of The Institution of Gas Engineers, Mr. E. V. Evans, and three Past-Presidents—Sir Frederick West (1941–42), Mr. George Dixon (1939–41), and Mr. Samuel Tagg (1923–24). Record or not, it was a telling indication of the interest which the Parent Body is actively taking in the work of the Junior organizations—an interest which can only lead to greater incentive and better understanding. The meeting was addressed by Mr. Evans, who talked with the members on the work of the Gas Research Board, and invited questions and expressions of opinion from all on the subject of the future status of the Junior Associations and the post-war policy of the Gas Industry.

Obituary

As we go to press we learn with regret of the death of Mr. GEORGE AIRTH, of Dundalk, who for 39 years was an officer of the Irish Association of Gas Managers, having occupied the Presidential Chair in 1905. He acted as Secretary and Treasurer for 27 years, retiring in 1936.

While on Home Guard duty on Oct. 15 Mr. W. N. SLINGSBY, Secretary and Commercial Manager of Walter Slingsby & Co., Ltd., of Keighley, was thrown from an army truck and died shortly after. Aged 36, he was well known in street lighting circles, and had represented his firm on the Society of British Gas Industries.

Mr. HORACE BROADBENT died on Oct. 21 at the age of 79, after 58 years' active association with the firm now known as Thomas Broadbent & Sons, Ltd., of Huddersfield. He was Chairman, and until recently Managing Director, and was the patentee of many revolutionary improvements in the design of centrifugal machinery.

T. G. Brooks

The presence at the graveside at Epsom Cemetery on Oct. 23 of so many of his colleagues in commercial life as well as his friends in the Gas and Heating Industries, Architectural profession, and Masonic circles was testimony of the high regard in which our "T.G.," as he was familiarly known, was held; the spontaneity of the letters of sympathy and telephonic enquiries we have received was further evidence. Such goodwill is a measure of compensation to those who, like my brother and myself, valued his friendship. Mr. Tom Brooks was the embodiment of kindness and good nature combined with a charming personality. Nothing was a trouble to him, and with his specialized knowledge and wide experience he was able to probe successfully into unusual problems, some of which from time to time you have thought suitable for record in your columns. T. F. C. POTTERTON.

Letters to the Editor

Showroom Activities in Wartime

DEAR SIR,—I was very interested to read your Editorial on Home Service in the "JOURNAL" of Oct. 21, and note that you reported in the same issue part of my remarks at the recent Southern Association Meeting (Eastern Section).

I trust you do not think I am not in favour of demonstrations; in normal times they are a useful and close link with our consumers. Our chief reason for discontinuing them was due solely to war conditions; and you may be interested to know that we have fully supported every national appeal by using our Showrooms for display purposes, including War Savings, Dig for Victory, Fruit Bottling, &c., and our demonstrator is available for advice and visits to consumers.

We have also a Fuel Economy Enquiry Bureau and Ministry of Food Information Enquiry Stand at both our Showrooms and the local War Savings Committee have the use of one of our Showrooms.

Hastings and St. Leonards Gas Company, Oct. 23, 1942.

Yours faithfully,
J. H. HORNBY,
Engineer and General Manager.

"A Gas Training College"

DEAR SIR,—I shall be grateful if you can spare me just a few lines to thank Mr. Thomas Smith for his letter of Sept. 8.

It is clear that we are in substantial agreement, and I am gratified to learn from him that gas authorities in the North of England are directing increased attention to the matter of post-war training. He may be sure that if there are any points about which we in the South can render assistance, we shall be most happy to do so.

Yours faithfully,
Westminster Technical Institute, Vincent Square, S.W. 1., Oct. 19, 1942.

J. N. LONG,
Principal.

Our photograph is of the Home Service Information Bureau in the Showrooms of the Luton Gas Company. We learn that enquiries are very brisk, and that the service is greatly appreciated by consumers and the general public.

The Montevideo Gas and Dry Dock Co., Ltd., announce the payment on Dec. 1 next of a dividend of 2% free of income-tax at 10s. in the £ on the Ordinary Capital of the Company, made up as follows: *Final:* 1% balance in respect of the year 1941 (making with the interim dividend of 1% paid on Dec. 1, 1941, and the partial final dividend of 2% paid on May 20, 1942, 4% free of income-tax for the year 1941). *Interim:* 1% on account of the year ending Dec. 31, 1942, declared by the Board at their Meeting on Oct. 20.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

Institution of Gas Engineers

The Council of The Institution of Gas Engineers met in London on Tuesday, Oct. 13.

The 3rd Report of the Chairmen's Technical Committee, 1941–42, incorporating short reports of the work of the Technical Committees of the Institution and of the Institution Gas Research Fellow and the Arthur Duckham Research Fellow, was approved for publication.

The Interim Report of the Gas Installations Committee was approved for submission to the Directorate of Post-War Building of the Ministry of Works and Planning. It was reported that the Institution is represented on the Standards Committee of the Directorate and on the Mechanical Installations Committee of the Institution of Mechanical Engineers, which is collaborating with the Directorate.

A report was made of the work of the Gas-Works Safety Rules Committee, and a Memorandum on a Scheme of Precautions against Frost on Gas-Works was approved for publication in booklet form.

The Meters Committee of the Institution was reconstituted for the consideration of the design of domestic consumers' meters for post-war housing.

It was reported that, at the invitation of the Lighting Committee of the Department of Scientific and Industrial Research, evidence would be submitted to that Committee by three representatives of the Joint Lighting Committee.

A report was made of a recent meeting of the Committee of Management of the Benevolent Fund, with particular reference to a statement relative to the proportion of members of the Institution, in each Affiliated District Gas Association, who are contributors to the Fund. It was agreed that every endeavour should be made to secure more subscriptions by Deed of Covenant.

The Reports of the Committees of Enquiry on the Standardization of Appliances and on Coke Quality respectively were approved by the Council.

It was reported that the tenure of the Institution Gas Research Fellowship, awarded to J. E. Garside, Ph.D., in the first place for one year from Aug. 1, 1941, had been extended for another year.

A report was made by the Acting Director of Research on the progress of the current investigations of the Gas Research Board.

Reports were made of Meetings of the Post-War Planning Committee of the B.G.F. and of its Sub-Committees.

Reports were made by District Members of the Council concerning activities in their Districts. Appreciation was expressed of the Addresses recently given by the President to members of the District Associations.

Consideration was given to further steps to be taken by the Institution in acting as focal point for bringing together gas engineers serving in Dominion, Indian, Colonial, and Allied Forces in the United Kingdom with their colleagues in this country, and a small War Hospitality Committee was appointed to deal with the matter.

Midland Association

A Meeting of the Midland Association of Gas Engineers and Managers was held in Birmingham on Oct. 15. Before opening the formal business of the meeting Mr. C. F. W. Rendle (President), expressed a hearty welcome to Dr. E. W. Smith, Director-General of Gas Supply.

Mr. Rendle announced that Mr. T. F. E. Rhead had agreed to accept the Office of Vice-President, and this election, he was sure, would be a most popular one.

Briefly reviewing the past 18 months, the period during which he had held the Office of President, Mr. Rendle stated that on taking office one of the things most prominent in his mind was co-operation. He had endeavoured to retain the fullest vigour of the Association by holding regular meetings, and these had been well attended. He had also made a diligent attempt to act in an adequate capacity as a District Member on the Council of The Institution of Gas Engineers. He realized there was sometimes a tendency to the view that London did not think in terms of the Provinces, but his experience had been to the contrary. He was of the opinion that if the provincial representative remained silent and did not express with clarity the views which his District held, London could not be blamed for disregarding a view of which it was unaware. His experience had been that when voicing in London the views of his own district, they had been fully listened to and acted upon.

The scale of salaries formulated by the Institution had not received a good reception, and as a result of this there had arisen new machinery for dealing with this matter, which was now working smoothly, and should place upon a sound footing the question of adequate salaries. Mr. Rendle believed this matter was now in expert hands.

The Advisory Panel of the Directorate of Gas Supply had done excellent work. He expressed the view that the Advisory Panel would live after the war, when its activities would enlarge rather than diminish. Consideration was also being given to a scheme to assist the smaller undertakings by providing a travelling laboratory.

Before leaving the Presidential Chair, he expressed his thanks to Mr. J. H. Wainwright for the excellent services received from the Secretary during his period of office. He welcomed Mr. A. H. Cranmer as his successor in the Presidential Chair.

Mr. Cranmer, in taking the Presidential Chair, expressed thanks for his election, and his pleasure in accepting the office.

A vote of thanks was proposed to the Retiring President, who was presented with a medallion as a symbol of the thanks of the Association for his services during the period he had been President.

The meeting was then addressed by Mr. J. C. Neve, Chairman of the Wolverhampton Gas Company, who expressed the deep appreciation of the services of Mr. Cranmer during the last 40 years, and he was sure the Association would have a useful year under his Presidency. He extended to all members an invitation to visit Wolverhampton upon a date to be fixed in the Spring of next year.

Mr. Cranmer then delivered his Presidential Address (see page 127).

A vote of thanks was proposed to the President for his Address by Mr. C. F. W. Rendle, and seconded by Mr. T. F. E. Rhead.

Dr. E. W. Smith said that co-operation had been mentioned, and he felt sure that the growth of co-operation had been one of the finest efforts in the Gas Industry. During the week it had been arranged that a Committee of four be set up to advise upon the best methods for further conservation of coal, and to determine what could be done in reducing the amount of oil used in carbureted water gas. Domestically a big economy had been wrought in the use of gas, but he thought more coke could be saved, particularly that used in producers. Everyone present knew the difficulties with regard to gas-works labour—the matter had recently been discussed in a particular direction, and he hoped it would be possible to get priority for such labour in all areas where work of national importance was in progress. He hoped the fullest consideration would be given in the need of improving amenities for labour in the direction of canteens, where possible, washing accommodation, baths, and in other ways.

In proposing a vote of thanks to Dr. E. W. Smith, the President fully endorsed the view of the provision of amenities referred to.

Mr. C. F. W. Rendle, in seconding the vote, referred to the probable extension of the functions of the Emergency Panel, stating that the matter had recently been discussed and they had been asked to investigate the working of the Panel, to enable consideration of the setting up of similar Panels in other parts of the country. A further meeting had been arranged for Nov. 3 so that representatives of other Districts could be informed what had been done, and how these results had been achieved.

Mr. N. C. W. Allin, West Bromwich, and Mr. F. H. Bate, Birmingham, were elected members of the Association.

An Urgent Need

To speed up the supply of non-ferrous metals and to save as much shipping as possible, the Ministry of Supply has issued an urgent appeal for all unwanted copper, zinc, lead, pewter, whitemetal, brass, bronze and scrap aluminium. The Gas Industry, it is thought, can do much to help this Campaign, since all the metals needed are widely used. It is requested, therefore, to search out all unwanted and unusable articles, such as copper cable, electrical parts and fittings, sheathing, tube, wire, turnings; zinc sheet, turnings; lead-covered cable, pipe, sheet, plumbers' jointings; bronze bushes, bearings, cocks, crown wheels, couplings, unions, valves, junction boxes; brass pipe, tube, sheet, turnings; whitemetal anti-friction metal, solder waste; aluminium (and its alloys), pipe, sheet, tube, turnings.

Non-ferrous metal may be disposed of to a depot specially provided by the local authority, or to a scrap metal merchant.

Potato Demonstrations

The Central Showroom of the Birmingham Gas Department was the venue on Oct. 14 and 15 of successful demonstrations arranged in co-operation with the Ministry of Food to encourage the use of potatoes.

Representatives of the local Press were invited on the morning of the first day, and the afternoon session was attended by 100 canteen supervisors and members of the wholesale and retail fruit and vegetable trade. The following day there was an attendance of over 150, representing the W.V.S., food leaders, domestic science teachers, British Restaurant and N.F.S. cooks, school canteens, &c.

A short talk was given on each occasion by a member of the staff of the District Food Office.

Visitors were able to sample numerous delightful dishes made from the ubiquitous potato.

Scottish Junior Gas Association (Eastern District)

The Opening Meeting of the Scottish Junior Gas Association (Eastern District) was held on Oct. 3, at the Heriot-Watt College, Edinburgh, Mr. S. G. Melville presiding.

Mr. Melville gave his Presidential, Address, being a "General Description of the A.R.P. Scheme." A full discussion followed, Mr. Melville replying to the points raised.

PROBLEMS OF TO-DAY AND TO-MORROW*

By
A. H. CRANMER,
Wolverhampton

A PRESENT-DAY problem of much importance is the question of the extraction of benzole by gas undertakings, many of which have installed recovery plants. Gas produced from coal carbonized in horizontal retorts is of higher calorific value than gas produced in continuous steamed vertical retorts and yields benzole of a better quality. In the continuous vertical retort the calorific value is generally from 450 to 475 B.Th.U., depending on the "declared" value, and in order to extract benzole from the gas, a decision has to be made on the question of either making gas of a higher quality before benzole extraction or reducing the "declared" value.

At Wolverhampton the "declared" value is 450 B.Th.U., and as I consider this an ideal figure, it would be necessary to increase the calorific value of our gas to about 480 B.Th.U. before benzole is extracted. To do this a large increase in the quantity of coal carbonized would be required, amounting to at least 12%. As it is difficult to obtain adequate supplies of coal for our present needs, it will be realized how much more difficult it would be to obtain the increased quantity necessary for benzole-washing conditions.

Another condition which affects this question at Wolverhampton is that our gas-making plant is being worked to its utmost limit. This is a difficult problem to solve, and I believe that many gas undertakings are in the same predicament.

One has to decide which is of the greater importance, production of benzole for the national effort, or the maintenance to the fullest possible extent of the supply of gas to factories engaged in the manufacture of munitions. At the present time, it is impossible to satisfy both needs.

Another present-day problem is that of economy in the use of gas. Most undertakings are faced with the responsibility of declining new orders for gas required for vital war work, not with any idea of impeding the war machine, but, of necessity, as the demand for gas at their works is either up to, or over, the limit of the productive capacity of their plant. Machinery could be set in motion to give the Gas Industry wide scope in the checking of wastage of gas in factories, which unfortunately does occur in many instances. Only recently, at Wolverhampton, after a particular Ministry had been refused additional supplies of gas a stage was reached when we offered to show how, by sending a technical representative to the works concerned, we could effect a saving in existing gas consumption equal to the amount required for the additional supply, but such saving could only be utilized after the alteration suggested by us had been carried out. I feel that greater powers should be given to enable the Industry to insist on savings in gas consumption being effected without further resort to any Ministry.

The question of coal supplies is a vexed and serious matter for most, if not all, gas engineers. Gas undertakings, or their engineers, are not consulted in any way with regard to the quality or class of coal supplied to them. Coal is allocated by the Mines Department in various quantities from particular collieries over a certain period, and as far as I can see without any consideration being taken as to the type of retorts in use at the individual gas-works and the class of coal needed for the most efficient working of the carbonizing plant.

In pre-war days when a gas engineer had a free hand and a free market, he would certainly obtain the coal most suitable for the retorts in use and which would give the best results in regard to make of gas per ton of coal and quality of coke. This was always our practice at Wolverhampton. The Mines Department, or whoever allocates present supplies, should have knowledge of the classes of coal required by individual gas-works for their efficient working and should base coal allocations accordingly. If this method had been adopted, so far as Wolverhampton is concerned there is not the slightest doubt that many tons of coal would have been saved, particularly during the last six months, when unsuitable coal was allocated to us, with the result that a considerably larger tonnage had to be carbonized to obtain the same quantity of gas as would have been produced by a smaller quantity of coal of the more suitable class.

Although we have no control over the quality of the coal supplied, we continued to test for ash content. Every wagon of coal received into the works is sampled and tested, particularly for ash content. Since 1939 the ash content in the coal received at Wolverhampton has increased considerably, the average increase over the pre-war figure at the present time being at least 3%, and in many cases higher still. My late Chief, Mr. P. G. Winstanley, was, I believe, one of the first gas engineers and managers to insert an ash content clause in coal contracts.

Turning for a few moments to post-war problems, I consider that in the interests of public health, the elimination of sulphur from gas should be made compulsory throughout the country, as also should a standard calorific value of, say, 450 to 475 B.Th.U.

Among other post-war interests of the Gas Industry are the questions of nationalization and regionalization, or what might be described as centralization. We hear rumours of the nationalization of the Gas Industry. I hope this will end in rumour. No doubt centralization will come, and in many cases would probably be advantageous. Centralization can be beneficial in many ways, particularly in regions where many towns are in close proximity, as, for instance, in the Midlands, but in my opinion it would be dangerous to have one super-manufacturing station supplying the whole area. I do not like the idea of putting all my eggs in one basket. Let there be a central super-producing station, if desired, but with this it would be safer to have other sub-stations, interlinked by trunk mains, with valves inserted, in order that each station could supply a particular area as an individual unit.

Within a 20-mile radius of Birmingham there are upwards of 30 gas undertakings; many of them are redundant, and the whole of this region could be supplied much more efficiently by a smaller number of producing stations, although, of course, there are many small undertakings where the cost of manufacturing gas into holder is quite as economical as in many larger works.

I would like to mention the question of holding companies. I do not believe that holding companies are of benefit generally to the Gas Industry or to the consumer, although I will admit that there are cases in which several companies linked together function with greater advantage. In such cases the holding companies have done and are doing good work, and the undertakings under their control have undoubtedly derived considerable benefit from the arrangement. This state of things would apply where a number of undertakings are grouped in one district, even though the district covers a large area and includes many separate works, both large and small. Where, however, the various undertakings are scattered over many different parts of the country situated many miles apart, and where undertakings have been bought by a holding company regardless of cost, I cannot see that any advantage is obtained. In the latter case, in order to pay dividends it is necessary not only to bleed the undertakings, but also to starve them, with the result that the works concerned have to suffer. I have visited gas-works owned by holding companies, and while many of them reflected credit on the management concerned, others were much the opposite. This is one of my reasons for opposing holding companies generally.

It should be borne in mind in considering the question of holding companies that in many individual company-owned undertakings the shares, or the majority of them, are owned by local people, and this being the case a much greater local interest is taken in the affairs of the gas undertakings than when the shares are taken over by a holding company.

Mr. Cranmer concluded his Address by describing the electrical tar precipitator at the Wolverhampton Gas-Works. He explained that the reason for the installation of this plant was the serious trouble experienced with tar fog in the crude gas, particularly in the gas produced in upwardly heated vertical retorts with heavily steamed charges, the principal trouble being the coating of the oxide in the purifiers with light oil, which reduced the efficiency of the purifiers seriously. It was decided to install two electro-detarrers, the capacity of each being 4 million cu.ft. of gas per day. The order was placed with Messrs. W. C. Holmes & Co., of Huddersfield, the Electric Construction Company supplying the electrical plant. The plant, said Mr. Cranmer, has given every satisfaction and has fully justified its installation, the efficiency being in excess of the guarantee of 99.5%.

* From a Presidential Address delivered on Oct. 15 to the Midland Association of Gas Engineers and Managers.

A Meeting of the Institute of Fuel will be held on Nov. 12 at 2.30 p.m. in the Connaught Rooms, W.C. 2, at which Dr. G. E. Foxwell will present a Paper entitled "The Provision of Smokeless Fuel for Post-War Reconstruction," which will be followed by a discussion. The meeting will be preceded by an informal luncheon at 12.30 for 1 p.m. at the Connaught Rooms, price 6s. 6d. per head.

We are Indebted to the Accident Offices Association, 1, Throgmorton Street, E.C. 2, for sending us a copy of a Memorandum entitled "Workmen's Compensation," reviewing the position under the Acts from the viewpoints of employer, employee, and the insurance offices.

The Directors of Associated Gas and Water Undertakings, Ltd., have declared an Interim Dividend of 2½% actual, less tax, on the Ordinary Stock, and 2½% actual, less tax, on the Deferred Stock, on account of the year ending March 31, 1943, payable Nov. 30, 1942. (The Interim Dividend on the Ordinary Stock is the same as paid last year, but this is a maiden dividend on the Deferred Stock, which Stock has only recently been created.)

A Series of Articles, in which many of our readers will be interested, is appearing in *Welding* (official journal of the Institute of Welding), under the title "Metal Surgery." The first two instalments were published in the September and October issues respectively and the Author, Mr. H. H. Hollis, of Oxley Engineering Co., Ltd., informs us that, when completed, it is intended to publish them in book form. Repair of gasholders is the main subject of the articles.

STANDARDIZATION OF APPLIANCES

PART I.—DOMESTIC GAS COOKERS

THE Council of the Institution set up the Committee of Enquiry on the Standardization of Appliances in July, 1941, with the following terms of reference: "To enquire into and make recommendations on the Standardization of Domestic Consumers' Appliances."

In considering the wide scope of the terms of reference the Committee decided at the outset to confine its attention to what is perhaps the most important appliance—*viz.*, the domestic gas cooker, believing that its conclusions regarding the standardization of this appliance would apply to a greater or lesser extent to other appliances. Part I of its Report deals with domestic gas cookers.

Introduction

It is considered desirable to define the background as the Committee saw it, against which its work has been done and its conclusions and recommendations must be judged. There are three parties concerned in the successful production and marketing of an appliance—the appliance maker, the gas supply undertaking, the consumer of gas. Upon the last the existence of the other interested parties ultimately depends. The dominant consideration which the Committee has borne in mind throughout its enquiries has been the interests of the consumers of gas. The Committee believes that what is good for the consumer will be of benefit to the other two parties.

In the past domestic consumers' appliances have generally been made by a comparatively small number of manufacturers who have specialized in the work. The gas undertakings, some 1,100 in number, have generally been the medium through which the needs of the consumers have been interpreted to the designers and makers of the appliances. This has, not unnaturally, led to a multiplicity of interpretations.

Competition between the appliance makers has generally been healthy and has resulted in marked progress in design and efficiency of appliances, particularly during the past 25 years, with material benefit to the consumer and to the Industry. The competition during the few years immediately preceding the war had resulted in the marketing of a multiplicity of new models, in which the modifications were not infrequently of a minor character, and for which there was no reasonable justification. Further, in order to secure business, the makers have been susceptible to pressure to make special alterations to suit individual buyers. Such alterations have often been of a trivial nature which, while conferring no benefit on the consumer, have complicated production of the appliance, and increased the cost of it. Thus the need became acute not only for a reduction in the number of models, but also for a simplification of the types themselves and the elimination of trivial alterations.

Adequate incentive to research and development in domestic consumers' appliances must be provided if the Gas Industry is to render its maximum contribution to the public welfare. The success of any endeavour to improve the present position in production of appliances must, in the view of the Committee, depend on the good will and understanding between gas undertakings and the appliance makers.

The implementation of any recommendations which the Committee may make must depend on the voluntary acceptance of such recommendations by both the appliance makers and the gas undertakings, and on their mutual agreement to work together for the furtherance of a common purpose.

Before reviewing the evidence submitted to the Committee certain points must be noted which have guided its enquiry.

At the outset of the enquiry the Committee realized that strictly the term "standardization" in engineering practice implies interchangeability of all parts, irrespective of the maker. Anything short of that is not *standardization* in the full meaning of the word, and for the purpose of distinction in this report is referred to as "rationalization."

The Committee took the view that the enquiry should embrace both aspects of the subject—*viz.*, (1) total standardization, (ii) rationalization.

The members of the Committee have sought to approach this enquiry from the standpoint of dismissing from their minds all preconceived ideas, and of determining, by obtaining evidence, the potential advantages and disadvantages of complete standardization on the one hand and rationalization on the other.

It was realized that a fully standardized cooker would be difficult to protect, for it could be made by any firm which, having to bear none of the development charges incurred by the reputable makers, would be in a position to undercut their prices (though the goods might not be as satisfactory), to the detriment of the reputable makers to whom the Industry owes so much. For though a large number of gas undertakings might be disposed to continue to deal with the present makers, the system of price tender imposed on some local authority undertakings might involve the acceptance of the lower tenders submitted by cut-price firms.

A further point in mind was that in some areas it might, after the war, be deemed to be in the interests of the town to place orders with a local firm, and so help to maintain employment in the town.

It seemed that complete standardization, even of one or two models, would not necessarily result in any marked reduction in first cost of the appliance, but that simplification in maintenance as the result of standardization would be an important factor. Other possible advantages would be usefulness in dealing with housing authorities as bulk purchasers, simplicity in dealing with architects and kitchen planning, simplicity in advertising a standard-priced appliance, and simplicity in showroom management.

It has been, and no doubt will be, open to any gas undertaking to select one or two cookers, and by so doing realize the advantages resulting from that policy.

The Committee at the commencement of its work reviewed the efforts which had been made about 1921 to produce a national standard cooker, and took notice of the reception of that cooker by the Gas Industry as a whole. This was disappointing, probably because it was a black cast-iron cooker and its advent coincided with the introduction of the enamelled cooker which the makers were popularizing.

The Committee also had before it the report of the discussion on Mr. R. J. Rogers's Paper at the 78th Annual General Meeting of the Institution.

Review of Evidence

An announcement was inserted in the Technical Gas Press inviting all interested to submit evidence to the Committee. It was disappointing to receive only one acceptance of this invitation. Other means had, therefore, to be used to obtain views representative, so far as possible, of the whole of the Gas Industry.

The Committee felt that the most satisfactory procedure was to request the Affiliated District Gas Associations and the Junior District Gas Associations to suggest the names of two and one of the members respectively, who would be competent to advise the Committee of the views on standardization obtaining in their respective areas and whom the Committee might invite to submit evidence to it. In addition, evidence was sought from the holding companies, which it was felt would be particularly helpful to the Committee in view of the special conditions obtaining in these nndertakings. The makers of appliances were asked, through the Society of British Gas Industries, to submit evidence, and a representative of the Gas Stove Makers' Panel appeared before the Committee. The Gas Salesmen's Circles were also invited, through the British Commercial Gas Association, to submit evidence.

The material requirements of the gas consumers can only be met in so far as their income allows. All witnesses agreed that consumers could be roughly divided into two classes, the ordinary consumers and prepayment consumers. There are over 12 million families in the country; 26–27% of these had an income of over £4 per week, and 73–74% had an income of less than £4 per week. Ordinary consumers are in general included in the former category and prepayment consumers in the latter. 36% of all families had an income of less than £2 10s. per week.*

These statistics are relevant, since the supply of appliances is vitally related to the ability of the consumer to pay for a supply of gas, and if, in addition, he has to pay a charge for the use of the appliance, the relation of that charge to the quality of the appliance supplied and the amount of gas consumed is important.

All witnesses agreed that the ordinary consumers (except perhaps a small minority) generally require a medium or high-grade cooker which is purchased outright, by instalments, or by short-term hire-purchase. These consumers usually require a choice of appliances, although some witnesses stated that a standardized medium-priced cooker would meet the needs of the majority of these consumers.

Prepayment consumers, on the other hand, are usually supplied either with a cooker on free loan (this applies in Scotland), on simple hire (the rental charge being included in the price of gas), or on some system of extended purchase.

The greatest charge on gas undertakings for the supply, fixing, and maintenance of gas cookers is, therefore, incurred on behalf of the prepayment consumer, a charge which, as the evidence showed, is enhanced by reason of the migration of this section of the population. Thus an appliance let out on hire in many cases remains in the custody of one consumer for a few years only, then, owing to his removal, it may have to be returned to store for reconditioning.

For many years the cooker usually supplied to prepayment consumers was a black cast-iron cooker, some of which remained in use for 30 years or more. But in the two decades before the war there was a gradually increasing demand for a low-priced modern enamelled cooker, and a growing acceptance on the part of housing authorities and others of the fact that the "working-class wife" should have the advantages of such an appliance, which is easier to clean and more

* Diamond, W. E. le B., "Gas J.," 1941, **235**, 397. The figures quoted refer to the year 1938.

pleasing in appearance than a black one. With the great increase in the building of artisan dwellings that must take place after the war (*a*) to replace those that have been destroyed, (*b*) owing to the continuation of the policy of slum clearance, and (*c*) to meet the needs of the increase in population, there will be a heavy demand for a low-priced modern enamelled cooker to be supplied over a period of years to keep pace with the national building programme. Adequate means to meet this demand are, therefore, of vital importance to the Gas Industry. The Committee has in consequence had this need particularly in mind in considering the whole problem of standardization.

Evidence was submitted by some witnesses that a number of undertakings had, in order to obtain the advantages of standardization, restricted their purchases to one or perhaps two low-priced modern enamelled cookers for prepayment consumers. This form of standardization has been and will presumably continue to be open to all gas undertakings.

In the case of holding companies there was evidence of a tendency to select two or more of the inexpensive models produced by the manufacturers, and to limit the choice of each of the controlled undertakings to one cooker from this selection for their prepayment consumers. Evidence was given of the adoption by some large undertakings of their own standard cooker for prepayment consumers, and of the purchase of these cookers from two or more manufacturers.

No evidence was given of collaboration between independent undertakings in the creation or adoption of a common standard modern cooker.

Modern enamelled cookers were normally supplied to prepayment consumers on simple hire or hire purchase terms. But some witnesses stated that they were only supplied on long term terminal hire, usually up to ten years. It was also evident that there was a growing tendency for gas undertakings to persuade consumers to purchase their appliances, and one or two witnesses also suggested that in post-war houses a gas cooker should be provided by the landlord as part of the designed equipment of the house.

It must be borne in mind that a large proportion of prepayment consumers were not in a position to purchase their cookers before the war, except to the extent of the additional charge added to the price of gas, and may be financially unable or unwilling to do so in the post-war period.

All witnesses were in favour of some measure of standardization, but most witnesses agreed that total standardization should be limited to appliances suitable for supply to prepayment consumers, leaving the field of the high-grade cooker free to makers for research and development. Nearly all witnesses were apprehensive lest the adoption of total standardization might hinder progress.

All witnesses were agreed as to the necessity of providing adequate incentive to progress in design and construction.

Assuming that a completely standardized modern low-priced enamelled cooker, made by all makers, could be produced, most witnesses agreed that such an appliance would be welcomed and would enable maintenance and fixing charges to be reduced. All witnesses were agreed that they would require to see such an appliance before accepting it. There was not unanimous agreement in favour of such a standardized appliance, since witnesses from certain undertakings that have already adopted a policy of standardization, as mentioned above, said they would not be in favour of adopting a nationally standardized appliance, unless it should offer very marked advantages over the appliance already adopted by them as a standard; one point specially mentioned was price. Another witness, whose undertaking has standardized on one particular model, in stressing the importance of maintaining the goodwill of the appliance makers and the need for continual research and development, thought that the interests of the Industry and consumers would be as well, if not better, served by the production of four or five different standard cookers, rather than by the production of one such standard only.

The evidence, while indicating the gradual disappearance of local customs—such as bread-baking—which have in the past influenced the design of cookers, was not conclusive as to the suitability of a single standard appliance for the needs of the whole country. On the other hand, the divergence of individual views on nearly all points of design and construction indicated the impossibility of securing, in present circumstances, acceptance by gas undertakings of a single standard design.

The representative of the gas stove makers who submitted evidence indicated that a panel of appliance makers had had under consideration for some time prior to the setting up of this committee the possibilities of simplification and rationalization of some component parts, and that agreement had already been reached about a number of items. The makers, through their representative, emphasized that, in their view, total standardization would hinder progress and development. He also drew attention to the fact that the reputable makers of appliances have in the past spent large sums of money on research and development and in rendering service in various directions to gas undertakings. Further, it was submitted that, in fairness to those makers who have invested their capital to supply the requirements of the Gas Industry and who have contributed so largely to progress hitherto, they should be assured of receiving the orders, on fair terms, for any fully standardized cooker that might be required. The difficulty of ensuring this was pointed out, since other manufacturers who had not incurred the expenses referred to above would be in a position to quote lower prices for the standardized article.

The statement was made on behalf of the manufacturers that complete standardization, even of one or two particular types of cooker, would not necessarily result in any substantial reduction of price beyond that which could be attained by the acceptance of each maker's own standard article, and the placing of orders for it in such volume as to ensure that the production lines were kept fully and steadily employed. It was further pointed out by the makers that it has been open to any gas undertaking in the past to confine its attention to any one type of appliance, and thus to secure the relevant advantages in maintenance, while retaining the benefits of competitive design and of a number of models from which to choose.

Those witnesses who were in favour of national standardization were not able to offer a solution to the problems of designing and producing a nationally standardized cooker and securing its acceptance by the Gas Industry. Some witnesses suggested that a panel constituted of representatives of The Institution of Gas Engineers, the appliance makers, and one or more of the able cookery demonstrators might possibly be able to design the ideal standard cooker, and that the model should be shown to gas undertakings by an independent demonstrator.

Another suggestion made to the Committee was that the appliance makers themselves should form a holding company for the purpose of producing a standard cooker for prepayment consumers, each separate appliance maker being free to continue research and development for the production of high-grade models.

It has to be remembered that the "buyer" has the privilege of "calling the tune." The consumer of gas is not in a position to decide for himself on the merits of standardization; he has to rely on the gas undertaking to take care of his interests in this respect. The gas undertaking therefore occupies the position of the "buyer," and should give the manufacturer a lead in this matter. The manufacturer is prepared to supply what his clients require, but he feels he is not in a position to take the initiative in regard to total standardization.

In general it can be said that all witnesses were agreed that some degree of standardization of components is a necessity, and that where such parts could not be completely standardized and made interchangeable as between one maker and another, each maker should at least standardize on component parts for his own models.

The evidence has shown that there is a large measure of agreement on many points. This has enabled the Committee to draw conclusions and to make recommendations. Evidence has been submitted to show that, while a larger oven is required in the North for bread-making, this custom is dying out, and could probably be neglected from the point of view of long-term planning. While all witnesses agreed that three sizes of oven would meet the needs of nearly all domestic consumers, more than one witness said that one size of oven was sufficient to meet the needs of 80% of his prepayment consumers.

Two burners are preferred to one for bread-making in the North, but the evidence indicated that this preference appeared to be a matter of habit rather than being founded on any scientific measurement.

Not sufficient evidence has been received by the Committee on which to base any recommendation as to insulation requirements for the oven.

Evidence was received from some witnesses that self-lighting burners—*i.e.*, burners in which the gas flame, if ignited at the injector, will pass forward to the burner head and re-establish normal burning conditions—should be provided. There is no difficulty in providing such burners, but they are more expensive to manufacture than the ordinary type of bunsen burner. Not sufficient evidence has been received regarding experience in the use of non-aerated flat flame burners, which are immune to lighting back, on cookers to warrant making any recommendations thereon.

Most witnesses were in favour of standardization of gas control taps and that makers should at least standardize on one tap for the whole range of their cookers. Pin niting should not be tolerated in any circumstances.

Certain witnesses have stressed the need for ease of cleaning. The possibilities of removal of the oven linings, covered-in grill frets, semi-solid or even solid hotplates need careful consideration. Ease of cleaning is essentially a consumer's need.

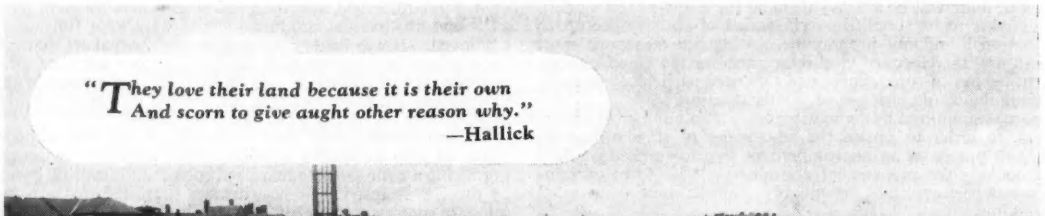
There is not sufficient evidence regarding the use of solid hotplates to enable the Committee to make a specific recommendation, but evidence was submitted to show that it would be advantageous to the consumer in facilitating movement of pans on the hotplate and cleaning.

All witnesses agreed that the calibration and setting notation should be uniform and that numbers were preferable to letters for the notation. Thermometer readings were not considered to be of interest to the consumer. A number of witnesses favoured total standardization.

It is understood that another Committee of Enquiry has reported on Gas Quality and Pressure, but a number of witnesses stressed the need for limitation in the variation of gas quality (characterized by both physical and chemical properties) and pressure to ensure reasonable uniformity in performance of appliances.

(*The Committee's Conclusions and Recommendations will be given in our next issue.*)

A Meeting of the General Committee of the National Federation of Gas Coke Associations will be held on Nov. 10 at Gas Industry House, 11 a.m.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And scorn to give aught other reason why."
—Hallick
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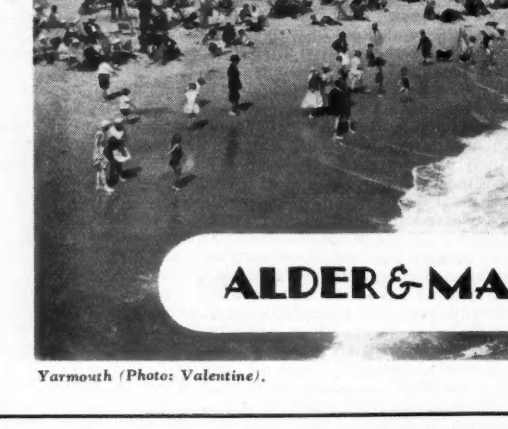

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VENTILATION AND HYGIENE

This article, contributed by Radiation Ltd., deals with the need for adequate ventilation in the habitable rooms of our houses, and the most reliable means of securing it. While realizing that the personnel of the Gas Industry condemns in general terms the flueless room, Radiation feel that it would help the Industry and its individual members to have specific facts at their disposal on the physiological effects of ill-ventilated rooms. Hence the marshalling of the following authentic information presenting briefly what they believe to be an unanswerable argument.

THE virtues of fresh air, of air in movement, have been known for many years. Life in the open air is recognized as more conducive to active physical health than an indoor life. Yet most of our people, the urban population, are compelled to spend probably from 85% to 90% of each weekday in office, shop, or factory, and in their homes. It is important, therefore, that indoor conditions shall be as healthy as possible.

It must be remembered that human beings are constantly producing, and at the same time losing, heat, and are exhaling water vapour both in expired breath and also by evaporation from the skin. An equilibrium has to be established between body heat production and heat loss, and it is largely by the cooling action of moving air that this balance is effected so as to produce comfort conditions. In addition, body odours (and even high standards of personal cleanliness do not completely prevent odours) must be so diluted as to become imperceptible, and bacteria which are expired with the breath and are always present in occupied rooms must be dispersed.

All these necessary conditions can only be realized by adequate air movement.

Dissipation of Odours

Most of the standards for fresh air supply in rooms, as already proposed, have been based on the air-flow required to remove body odours. Recommendations have been put forward by H. E. Roscoe; De Chaumont; Yaglou, Riley, and Coggins; Bedford; and others. As could be expected with improving standards of personal cleanliness, later workers have proposed a somewhat lower air-flow than earlier investigators. Yaglou, Riley, and Coggins (1936) found that the amount of fresh air needed depended on the class of people concerned. For persons of average social status, and with an air space of 200 cu.ft. per person, they recommended the figure of 1,000 cu.ft. per hour per occupant.

Bedford in *Modern Principles of Ventilation and Heating*, concluded that, for most ordinary conditions, an air supply of 1,000–1,200 cu.ft. per hour per individual will be satisfactory.

These figures receive support from L.C.C. Bylaw No. 149 (1937), which, dealing generally with the ventilation of habitable rooms, implies that fresh air is to be supplied to all parts of the room at the rate of not less than 750 cu.ft. per hour per person, or per 50 sq.ft. of floor area, whichever is the greater requirement.

In somewhat small rooms with a number of occupants, for the effective dissipation of body odours, a higher rate up to 1,000 cu.ft. or even 1,200 cu.ft. per hour per person may be desirable.

In addition to the aesthetic objection to unpleasant odours in habitable rooms, there is evidence that such odours have an injurious effect on health, resulting in demonstrable reduction in appetite for food.

Maintenance of Bodily Comfort

Dealing with heat equilibrium, the human body at rest produces approximately 400 B.Th.U. of heat per hour. During physical exertion the heat production rises, but the figure given represents what is termed the "basal metabolism." The body must lose heat, and this process is effected by radiation, convection, and evaporation.

As already mentioned, it is largely by means of air movement that the temperature equilibrium of the body is maintained so as to yield the sensation of comfort. The discomfort felt in a crowded, ill-ventilated room is a result of the failure to effect body heat equilibrium in this way.

Dispersal of Bacteria

There are additional reasons why an ample supply of fresh air is needed in habitable rooms. One necessity is to reduce microbic concentration; thus H. M. Vernon ("Principles of Heating and Ventilation") writes: "The effect of human contamination of the air in occupied rooms is also exhibited by the number of micro-organisms present. Such organisms are frequently derived from the respiratory tract, and are liable to carry infection from one occupant to another and cause the spread of colds, influenza, and other diseases."

Hill and Campbell, and Vernon, give data of the enormous number of bacteria which have been found in places frequented by many people when ventilation was insufficient.

The percentage of carbon dioxide in the air—resulting from the expired breath of human beings—is used as the criterion for the concurrent presence of bacteria. Accordingly the Factory Acts, which specify the permissible concentration of carbon dioxide, employ this figure as a measure for ensuring that bacteriological contamination shall be kept down to a safe limit.

Bourdillon and Lidwell (*British Medical Journal* and *Lancet*, 1941) refer to the great number of infected droplets expired by a sneeze.

Adequate ventilation is therefore a measure to prevent, or at least reduce, the spread of the commoner complaints such as colds and influenza. In winter, when inclement weather keeps people indoors and when these complaints are most prevalent, the need for a safe margin in the air-change of occupied rooms becomes of increasing importance.

Fresh Air and Health

Medical men also lay emphasis on the necessity for air-movement to maintain a healthy condition of the respiratory passages. Warm stagnant air causes the mucous membrane of the nose to become swollen and congested—a favourable condition for the growth of bacteria. Over-heated houses are injurious to health, and the following emphatic statement has been made by a leading physiologist: "Bad ventilation is undoubtedly the commonest cause of colds."

Cool moving air is particularly desirable in bedrooms, since the impact of cool air is of great value in promoting healthful sleep.

Summarizing the preceding paragraphs, hygienists agree in emphasizing the importance of adequate ventilation because:

(*a*) Dissipation of body odours requires a certain minimum air-flow.

(*b*) Adequate ventilation is a safeguard in reducing microbic concentration.

(*c*) The equilibrium between body heat production and heat loss is largely effected by air movement.

(*d*) The membranes of the respiratory passages are prejudicially affected by warm, stagnant air.

(*e*) Cool air is stimulating to human beings.

Means for Providing Ventilation

How then is the necessary ventilation requirement to be adequately and dependably satisfied? The use of an open window cannot be relied upon; too many people will not tolerate draughts and incoming dirt and dust in urban areas. The means of ventilation must be incorporated in the house structure, and in this connexion divergent views are expressed, arising, no doubt, from the several interests concerned with house planning and building. This difference of opinion has chiefly centred round the provision in certain rooms of a perforated grating, generally referred to as an "air-brick," in an outside wall near ceiling level, instead of building a chimney-flue, on the grounds that floor space is conserved and savings in building costs are effected.

The need for adequate ventilation is, however, so important that an air-grating as a substitute for a flue should not be employed until full consideration has been given to its effectiveness as compared with that of the chimney-flue.

This subject had been examined by a number of investigators, and particular attention is drawn to a contribution to the *Journal of Hygiene* of March, 1940, by C. G. Warner, whose results confirm those of earlier workers that a flue is a more dependable and efficient means of providing ventilation than an air-grating.

Flues and Air-Gratings Compared

The following conclusions represent an impartial summary of the relative performance of flue and air-grating in effecting natural ventilation:

(i) A flue in general provides more positive ventilation in a room than an air-grating, when the temperatures inside and outside are the same or differ only slightly, and other conditions are equal.

(ii) When the temperature inside is higher than outside, ventilation *via* a flue increases, that through an air-grating is only slightly affected.

(iii) With a source of heat below the flue, ventilation is increased. This cannot be achieved through use of an air-grating.

(iv) Noticeable draughts of incoming air may occur through air-gratings with certain wind directions. These draughts can become intolerable if the inlet area is considerable.

A flue with suitable terminal arrangements acts as an extractor under all outside wind conditions.

(v) If outside air passes into a room through an air-grating, smuts, dust, &c., will also enter.

The action of an air-grating is uncertain, dependent as it is on the strength and direction of the wind outside. Numerous instances have been reported of the sealing of the grating to overcome draughts when the wind is in a certain quarter. The air-grating permits of the passage of dirt and dust into the room; this is particularly disadvantageous in urban areas.

(*Concluded on p. 136*)

Gas Products Prices

The London Market Oct. 26.

The only item of interest in connexion with the London Coal Tar Products market is that fair quantities of Pitch are being sold on the basis of 45s. per ton naked at Makers' Works. Otherwise no change.

The Provinces Oct. 26.

The average prices of gas-works products during the week were: Pitch and Crude Tar,* Toluole, naked, North, 90's, 1s. 10d., pure, 2s. 5d. (controlled by the Control of Toluene No. 2 Order, July 3, 1941, which fixes the maximum price at which this material may be sold). Coal tar, crude naphtha, in bulk, North, 1s. to 1s. 4d. according to quality. Solvent naphtha, naked, North, 2s. 2d. to 2s. 6d. Heavy naphtha, North, 1s. 10d. to 1s. 11d. Carbolic acid, 60's, controlled by the Coal Tar Acids Prices (Inland) Order, 1942, operative from May 1. Naphthalene, controlled by the Naphthalene prices (Inland) Order, 1942, dated April 15, 1942, and operative from May 1, 1942, £19 to £19 10s.—bags free. Anthracene, controlled by the Anthracene Prices (Inland) Order, 1942, operative from May 1. Filtered heavy oil (min. gr. 1,080), 7½d. to 8d. Creosote oil has been generally controlled as to direction and price for some time past. Current value—fuel grades 5d. to 5½d.; timber preservation and other purposes 4¾d. to 6d. These prices apply as from May 13.

*In regard to pitch and crude tar prices we would ask readers to refer to the editorial note on p. 396 of the "JOURNAL" for Sept. 10, 1941.

Tar Products in Scotland Oct. 24.

Deliveries are proceeding rapidly. Refined tar controlled. Value is 4½d. per gallon *ex* Works, naked. Creosote oil: Specification oil, 6¾d. to 7d.; low gravity, 7¼d. to 7½d.; neutral oil, 6¾d. to 7d. per gallon; all *ex* Works in bulk. Refined cresylic acid is scarce at 3s. 6d. to 4s. 6d. per gallon *ex* Works, naked, according to quality. Crude naphtha: 6½d. to 7d. Solvent naphtha, 90/160 grade, 2s. 3d. to 2s. 6d., and 90/190 Heavy naphtha, 1s. 9d. to 2s. per gallon. Pyridine: 90/160 grade, 13s., and 90/140 grade, 15s. per gallon.

Gas Stocks and Shares

Although markets were irregular at the opening last week the tone became much brighter and business heavier as the week progressed and especially after General Smuts' speech. The strength of home rail stocks was a feature throughout. The Gas Market also displayed a bright appearance with a better turnover. A larger number of stocks were marked up in the Official List than for some time past, including a number of "ordinaries." Among these the most important was the rise of 1s. in Gas Light units. These units, it will be remembered, have been steadily rising for some weeks past and the present price compares with the quotation of 13s. at the beginning of the year. It will be seen that the Company's maximum dividend and preference stocks also improved in value. Bombay ordinary hardened 9d. to 20s. 3d. No changes took place in either the Supplementary or Provincial Lists.

The following is a full list of the price changes which occurred during last week:

OFFICIAL LIST

Associated Gas & Water Undertakings 4½ p.c. Red. Cum. Pref.	17/—18/-	+-/6d.
Ditto 4 p.c. Red. Cum. Pref.	17/—18/-	+1/-
Ditto 4 p.c. Cum. Pref.	13/6—14/6	—
Bombay Ord.	19/9—20/9	+-/9d.
Croydon max. Div.	85—90	+1
Gas Light Ord.	15/—16/-	+1/-
Ditto 3½ p.c. max.	55—60	+3
Ditto 4 p.c. Pref.	72—77	+4

OFFICIAL LIST—*continued.*

Gas Light Ord. 3¾ p.c. Red. Pref.	75—80	+3
Severn Valley Ord.	18/—20/-	+-/6d.
South Metropolitan Ord.	58—63	+2
South Suburban Ord.	79—84	+1
Ditto 4 p.c. Pref.	77—82	+1
Tottenham 4 p.c. Deb.	92—97	+2
United Kingdom Gas Corporation Ord.	16/6—17/6	+-/6d.

With reference to the statement in our issue of October 14 that at an Extraordinary General Meeting of Associated Gas and Water Undertakings, Limited, the issued Ordinary Shares of £1 each had been subdivided into 1 Ordinary Share of 12s. and 1 Deferred Share of 8s., it should be added that by a subsequent resolution these Shares were converted into Stock transferable in units of £1.

TRADE CARDS

FULL particulars of these spaces can be obtained on application to the Publishers. They are designed principally for the use of the firms whose display advertisements cannot be included owing to paper rationing.

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WRITE FOR CATALOGUE.

(*Concluded from p. 135*)

The chimney flue does not suffer from these disadvantages, and with a suitable stack will provide adequate air-change without intrusion of outside noise, dust, dirt, &c. With a source of heat in the fireplace ventilation will be increased, and this is necessary in a warmed room with several occupants.

On the general question of the provision of flues in living-rooms and bedrooms, a Committee of the Royal College of Physicians, London, has expressed the following opinion: " . . . Until there is evidence forthcoming that satisfactory ventilation can be otherwise obtained, the Committee is of opinion that wherever possible living-rooms and bedrooms should be provided with flues."

What of the Future?

Now that post-war planning and rebuilding are the subjects of so much consideration, it is important that the right decision should be reached on the means for ventilation to be provided in the dwellings of the future.

There is no difference of opinion on the necessity of a pure water supply and the provision of approved drainage and sanitary arrangements. Should not a similar unanimity be reached on the subject of ventilation? The problem is not incapable, or even difficult, of solution. It only requires the co-operation of those concerned—hygienists, architects, and builders—to ensure that our post-war homes are constructed on sound and correct principles.

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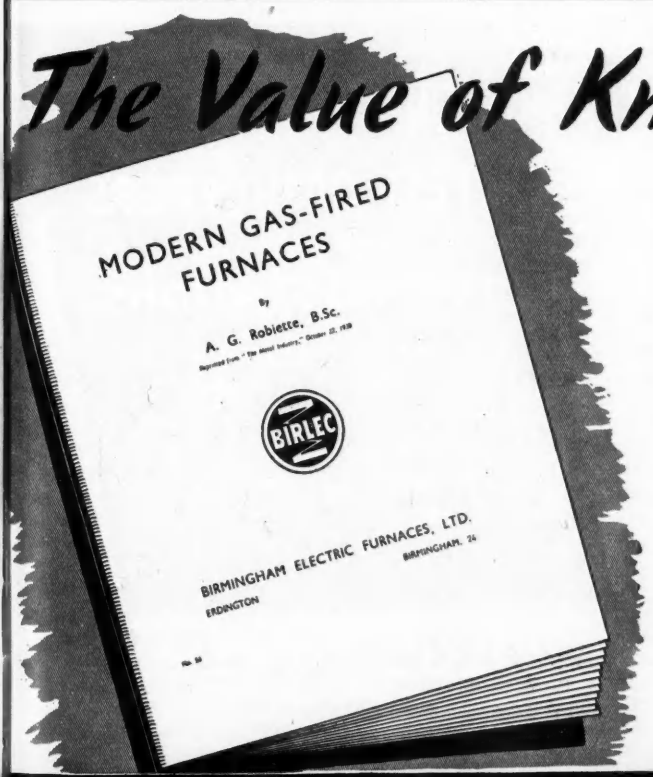

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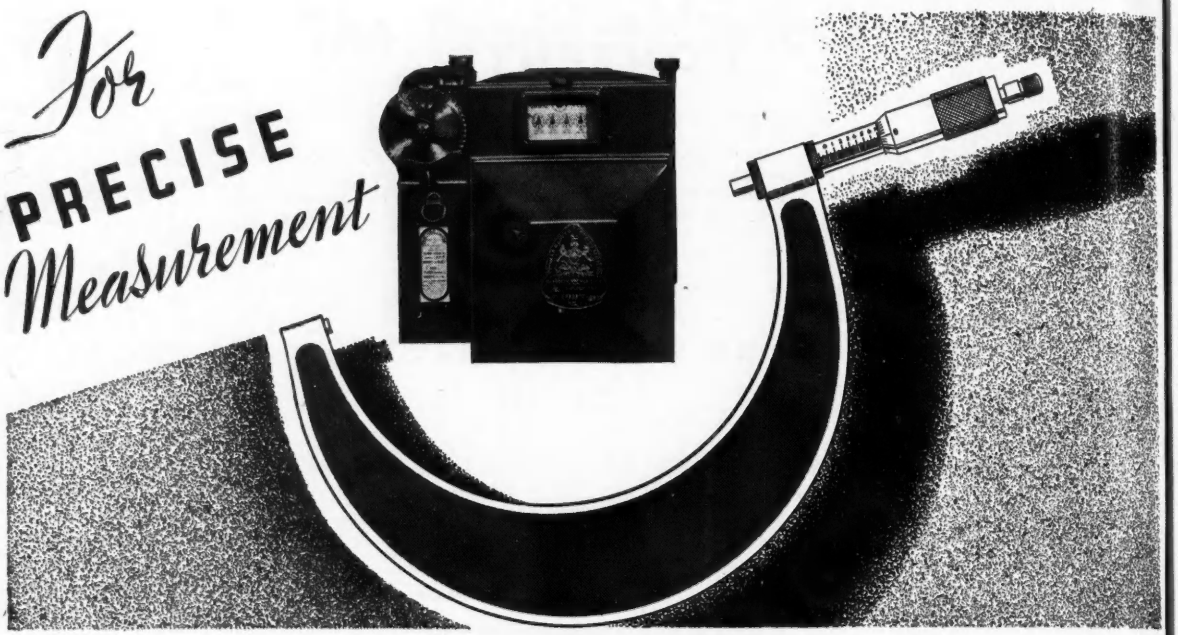

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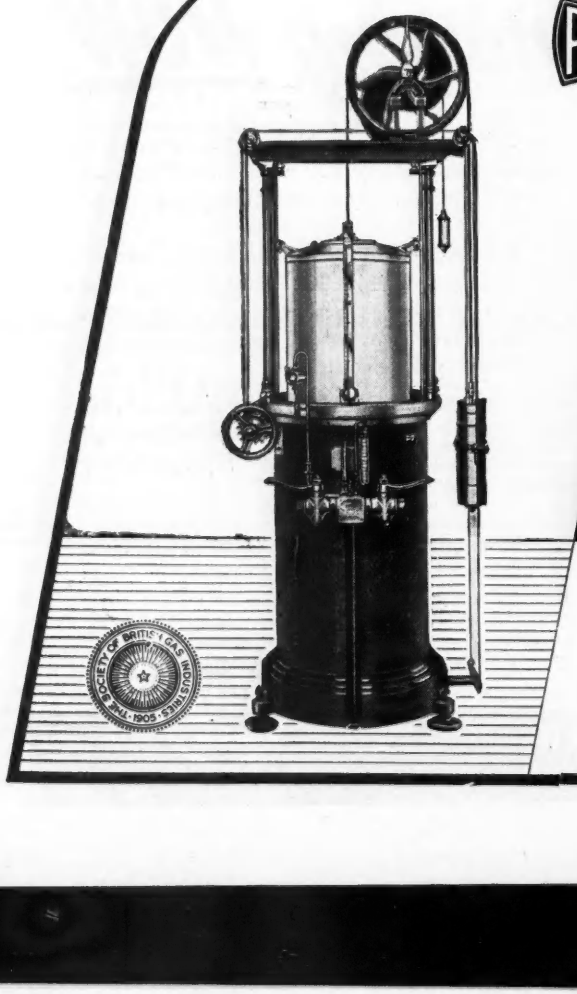

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